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EXAMINER	
AGUSTIN, PETER VINCENT	
ART UNIT	PAPER NUMBER
2652	

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/070,288	NAKANISHI ET AL.	
	Examiner	Art Unit	
	Peter Vincent Agustin	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 11-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 September 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 16 & 17 are objected to because of the following informalities:

Claim 16, line 7: the limitation "the information recording medium" is newly added but it is not underlined. This limitation needs to be underlined or deleted from the claim.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-9, 11 & 16-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 & 16 recite the limitations "the reflected beams of the main beam", "the obtained zero order diffracted beam", and "the first diffraction grating" on the last two lines of each claim. There is insufficient antecedent basis for these limitations in the claims.

Claims 2-9, 11 & 17-21 are dependent upon rejected base claims.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 9 & 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamazaki (US 5,608,695).

In regard to claim 1, Yamazaki discloses an optical semiconductor device (figure 6) comprising: a laser element (29); an emitted beam dividing portion (28b) for dividing an emitted light beam from the laser element into a main beam (column 4, line 44: "0-order beam") and two sub beams (column 4, line 45: "+1-order and –1-order diffracted beams"); a reflected beam dividing portion (28a) for dividing a reflected light beam from an information recording medium into light beams in different focused states; servo-signal-detecting photodetector elements (figure 7, elements 31 & 34; column 5, line 15) for receiving the reflected light beams obtained by the division by the reflected beam dividing portion in a defocused state; and a signal-detecting photodetector element (figure 7, elements 32 & 33) for receiving reflected light beams obtained through the reflected beam dividing portion, wherein the emitted beam dividing portion includes a first diffraction grating region for generating the main beam, and second and third diffraction grating regions for generating the sub beams (the claimed regions correspond to the respective regions of element 28b that emit the 0, –1 & +1 order beams), and the signal-detecting photodetector element receives a beam that is obtained by diffracting the reflected beams of the main beam with the reflected beam dividing portion and then diffracting the obtained zero order diffracted beam with the first diffraction grating.

In regard to claim 2, Yamazaki discloses that the emitted beam dividing portion is provided on a surface of a transparent optical element (figure 6, element 28).

In regard to claim 3, Yamazaki discloses that two diffracted light beams of the same order diffraction (column 4, lines 39-43) by the first diffraction grating are subjected to the diffraction with different diffraction efficiencies, and the diffracted light beam having the higher

diffraction efficiency is received by the signal-detecting photodetector element (one of elements 32 & 33 of figure 7).

In regard to claim 4, Yamazaki discloses that each grating in the first diffraction grating is of an inclined type having a step-like cross-sectional shape or a triangular cross-sectional shape (see figure 6, element 28b).

In regard to claim 9, Yamazaki discloses that the first diffraction grating is composed of a plurality of diffraction grating regions that divide a spot of the reflected light beam equally (see figure 7, elements 35-38).

In regard to claim 16, this claim has limitations that are similar to or inherent from those of claim 1; thus, it is rejected using the same rationale as applied against claim 1 above. Furthermore, in regard to claim 16, Yamazaki discloses an optical information processing device (figures 5 & 6) comprising: an optical system (22) for guiding the light beams obtained by the division by the emitted beam dividing portion to an information recording medium (23); and the information recording medium (23).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Opheij et al. (US 4,918,679).

For a description of Yamazaki, see the rejection above. However, Yamazaki does not disclose that the gratings are in a curved line form.

Opheij et al. disclose gratings in a curved line form (see figures 7 & 8). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the curved gratings of Opheij et al. for the emitted beam dividing portion of Yamazaki, the motivation being to ensure high quality imaging of the radiation source in the scanning spot of the optical recording medium (column 3, lines 18-27).

8. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Heemskerk (US 4,665,310).

For a description of Yamazaki, see the rejection above. In regard to claim 6, Yamazaki does not disclose that the first diffraction grating is composed of a plurality of diffraction grating regions having the same diffraction efficiency. In regard to claim 7, Yamazaki does not disclose that the first diffraction grating is composed of at least two diffraction grating regions that differ from each other in a direction in which gratings are arranged. In regard to claim 8, Yamazaki does not disclose that the first diffraction grating is composed of diffraction grating regions having the same grating periodic interval.

Heemskerk discloses a diffraction grating (figure 2) composed of a plurality of diffraction grating regions (13) having the same diffraction efficiency and the same grating periodic interval (claims 6 & 8). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the diffraction grating having regions of the same diffraction efficiency and periodic interval of Heemskerk for the device of Yamazaki, the

motivation being to avoid undesired effects such as different diffraction efficiencies of the sub-gratings and focusing of the sub-beams in different planes (column 4, lines 10-17).

Heemskerk discloses a diffraction grating (figure 2) composed of two diffraction grating regions (13 & 14) that differ from each other in a direction in which the gratings are arranged (claim 7). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the two-region diffraction grating of Heemskerk for the device of Yamazaki, the motivation being to avoid an offset of the focus-servo signal caused by wavelength variations of the beam (column 4, lines 18-27).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Miyazaki et al. (JP 10134395 A).

For a description of Yamazaki, see the rejection above. However, Yamazaki does not disclose that when the emitted beam dividing portion is positioned on an optical axis extending between an emission point of the laser element and a main spot formed via an objective lens on the information recording medium, the reflected light beam from the foregoing information recording medium entering a region satisfying a formula shown below is divided so as to be collected on the signal-detecting photodetector element: $r \leq d \times \tan(\sin^{-1}(NA))$ where: d represents an air-equivalent distance from the emission point of the laser element to the emitted beam dividing portion; NA represents a numerical aperture of the objective lens; and r represents a distance from a point at which the optical axis and the emitted beam dividing portion cross each other on the emitted beam dividing portion.

Miyazaki et al. disclose an optical pickup having dimensions satisfying an equation very similar to the claimed $r \leq d \times \tan(\sin^{-1}(NA))$, wherein the purpose is to prevent undesired

crosstalk and to enable accurate signal detection (see abstract and figure 5). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the equation of Miyazaki et al. to provide a size boundary for the beam spot of Yamazaki, the motivation being to prevent undesired crosstalk and to enable accurate signal detection.

10. Claims 12 & 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Kurata et al. (US 5,111,449).

In regard to claim 12, Yamazaki discloses an optical element (figure 6) comprising: a first optical element (28b) that is provided on one surface of a transparent member (28) and that includes a first diffraction grating; and a second optical element (28a) that is provided on the other surface of the transparent member and that divides a reflected light beam into light beams in different focused states. Yamazaki, however, does not disclose that the first optical element includes a second diffraction grating wherein the first and second diffraction gratings are juxtaposed in a first direction, and gratings of the first diffraction grating are arranged in a direction different from the first direction.

Kurata et al. disclose an optical element (figure 5, element 2) having first (2b) and second (2a) diffraction gratings juxtaposed in a first direction (track direction), and gratings of the first diffraction grating are arranged in a direction different from the first direction. It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the optical element of Kurata et al. for the device of Yamazaki, the motivation being to reduce the number of optical parts and to enable accurate tracking servo control (column 4, lines 49-65).

Furthermore, in regard to claim 13, Kurata et al., and hence the obvious combination noted above, disclose that the first diffraction grating is of an inclined type having a triangular cross-sectional shape (see figure 6, element 28b).

11. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki & Kurata et al. as applied to claim 12 above, and further in view of Opheij et al.

For a description of Yamazaki & Kurata et al., see the rejection above. However, Yamazaki & Kurata et al. do not disclose that the gratings are in a curved line form.

Opheij et al. disclose gratings in a curved line form (see figures 7 & 8). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the curved gratings of Opheij et al. for the emitted beam dividing portion of Yamazaki & Kurata et al., the motivation being to ensure high quality imaging of the radiation source in the scanning spot of the optical recording medium (column 3, lines 18-27).

12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki & Kurata et al. as applied to claim 12 above, and further in view of Heemskerk.

For a description of Yamazaki & Kurata et al., see the rejection above. However, Yamazaki & Kurata et al. do not disclose that the first diffraction grating is composed of at least two diffraction grating regions that differ from each other in a direction in which gratings are arranged.

Heemskerk discloses a diffraction grating (figure 2) composed of two diffraction grating regions (13 & 14) that differ from each other in a direction in which the gratings are arranged. It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the two-region diffraction grating of Heemskerk for the device of

Yamazaki & Kurata et al., the motivation being to avoid an offset of the focus-servo signal caused by wavelength variations of the beam (column 4, lines 18-27).

13. Claims 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Hasegawa et al. (US 5,881,043).

For a description of Yamazaki, see the rejection above. Furthermore, in regard to claim 18, Yamazaki discloses that a pair of the servo-signal-detecting photodetector elements (figure 7, elements 31 & 34) are arranged symmetrically with respect to an optical axis; and the signal-detecting photodetector element (32 or 33) is arranged at a shorter distance from the optical axis than the servo-signal-detecting photodetector elements, wherein the pair of the servo-signal-detecting photodetector elements and the signal-detecting photodetector element are integrated (see figure 6, element 26). However, Yamazaki does not disclose that the signal-detecting photodetector has a light-receiving area smaller than a light-receiving area of the servo-signal-detecting photodetector elements (claims 17 & 18).

Hasegawa et al. disclose a signal-detecting photodetector (figure 2, elements 3a & 3b) having a light receiving area smaller than a light-receiving area of servo-signal-detecting photodetector elements (4a & 4b). It would have been obvious to one of ordinary skill in the art at the time of invention by the applicant to have used the signal-detecting photodetector smaller than a servo-signal-detecting photodetector for the device of Yamazaki as suggested by Hasegawa et al., the motivation being to reduce the space consumption and weight of the optical device (see column 1, lines 33-45).

Furrthermore, in regard to claim 19, Yamazaki discloses that the signal-detecting photodetector element is positioned closer to one of the servo-signal-detecting photodetector elements (see figures 6 and 7).

In regard to claim 20, Yamazaki discloses that the signal-detecting photodetector element is provided in substantially a same plane as the emission point (see figure 6, element 29).

In regard to claim 21, Yamazaki discloses that the signal-detecting photodetector element is divided into a plurality of detecting sections having substantially equal areas (see figure 7, elements 32 & 33).

Response to Arguments

14. Applicant's arguments filed September 24, 2004 have been fully considered but they are not persuasive.

15. In regard to page 11, paragraph 2, the applicants argue that Yamazaki fails to teach or suggest an emitted beam dividing portion including three diffraction grating regions for generating a main beam and two sub beams. The examiner disagrees. As noted on item 5 above, Yamazaki teaches an emitted beam dividing portion (28b) including three diffraction grating regions for generating a main beam (column 4, line 44: "0-order beam") and two sub beams (column 4, line 45: "+1-order and –1-order diffracted beams"), wherein the three diffraction grating regions correspond to the respective regions of element 28b that emit the 0, –1 & +1 order beams.

16. In regard to page 11, paragraphs 5, 7 & 9, the applicants argue that claims 5-8 & 11 are allowable because they depend from claim 1. However, in view of item 15 above, the examiner maintains the rejections.

17. In regard to page 12, paragraph 4, the applicants notes that Yamazaki does not teach or suggest a first optical element including a first and second diffraction grating and a second optical element provided on the other side of a transparent member. The examiner already acknowledged in the previous Office Action that while Yamazaki discloses a first optical element including a first diffraction grating and a second optical element provided on the other surface of a transparent member, Yamazaki does not disclose that the first optical element includes a second diffraction grating (see item 10 of this Office Action). The applicants then note on the same paragraph that Yamazaki does not teach or suggest a structure (first optical element) that is capable of generating functioning to both generate a main beam and to diffract a beam reflected from the second optical element. The "structure that is capable of generating...." is not claimed. Finally, in regard to page 12, paragraph 5, the applicants argue that Kurata et al. do not remedy the deficiencies of Yamazaki, and that Kurata et al. simply discloses various configurations of diffraction gratings, and that it would not have been obvious to modify Yamazaki to have a first optical element with different diffraction gratings. The examiner maintains that it would have been obvious as set forth in item 10, supra.

18. In regard to page 12, last paragraph, and page 13, paragraph 2, the applicants argue that claims 14 and 15 are allowable because they depend from claim 12. However, in view of item 17 above, the examiner maintains the rejections.

19. In regard to page 13, paragraph 4, the applicants argue that claims 17-21 are allowable because they depend from claims 1 & 16. However, in view of item 15 above, the examiner maintains the rejections.

Conclusion

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Vincent Agustin whose telephone number is 703-305-8980. The examiner can normally be reached on Monday-Friday 9:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Thi Nguyen can be reached on 703-305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

BRIAN E. MILLER
PRIMARY EXAMINER

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Peter Vincent Agustin
Art Unit 2652